Claims

1. A method of generating digital traffic for use in testing a multi-port communications device, said method comprising the steps of:

generating a reference pattern defining the digital traffic; and

generating a plurality of traffic streams from the reference pattern, whereby the plural traffic streams are used for loading respective input ports of the communications device.

2. The method as claimed in claim 1, further including the step of introducing respective phase delays between said plural traffic streams.

3. The method according to claim 2, wherein the communications device effects statistical multiplexing.

4. The method according to claim 3, wherein the plural traffic streams are continuous digital data streams.

5. The method according to claim 4, wherein the plural traffic streams are ATM cell streams.

6. A method of loading a multi-port communications device with digital traffic, said method comprising the steps of:

generating the digital traffic; and

providing plural streams of the generated digital traffic to respective input ports of the communications device with phase delays.

7. The method according to claim 6, wherein the communications device effects statistical multiplexing.

8. A method of loading a multi-port communications device with digital traffic, said method comprising the steps of:

generating a plurality of identical digital traffic streams; and

providing the identical streams with phase delays to respective input ports of the communications device.

9. The method according to claim 8, wherein the communications device effects statistical multiplexing.

10. A method of operating a digital traffic replicating device, comprising the steps of:

receiving a digital traffic stream;

generating a plurality of output digital traffic streams from the received digital traffic, wherein the output streams include respective phase delays.

11. The method according to claim 10, wherein the output streams have traffic patterns which are replicas of the received digital traffic stream.

12. The method according to claim 8, wherein the communications device effects statistical multiplexing.

13. Apparatus for generating digital traffic for use in testing a multi-port communications device, said apparatus comprising:

means for generating a reference pattern defining the digital traffic; and

means for generating a plurality of traffic streams from the reference pattern, whereby the plural traffic streams are used for loading respective input ports of the communications device.

14. The apparatus as claimed in claim 15, further including means for introducing respective phase delays between said plural traffic streams.

15. The apparatus according to claim 14, wherein the communications device effects statistical multiplexing.

16. The apparatus according to claim 15, wherein the plural traffic streams are continuous digital data streams.

17. The apparatus according to claim 16, wherein the plural traffic streams are ATM cell streams.

18. An apparatus for loading a multi-port communications device with digital traffic, said apparatus comprising:

means for generating the digital traffic; and

means for providing plural streams of the generated digital traffic to respective input ports of the communications device with phase delays.

19. The apparatus according to claim 18, wherein the communications device effects statistical multiplexing.

20. Apparatus for loading a multi-port communications device with digital traffic, said apparatus comprising:

means for generating a plurality of identical digital traffic streams; and

means for providing the identical streams to respective input ports of the communications device with phase delays.

21. The apparatus according to claim 20, wherein the communications device effects statistical multiplexing.

22. A digital data stream replicating device, comprising:

an input port for receiving an input continuous digital data stream at an input transmission rate;

broadcast means for replicating the input digital data stream N times;

N output ports for transmitting each such replicated digital data stream through a separate output port at an output transmission rate at least equal to the input transmission rate; and

delay means for introducing a relative delay for each said output digital data stream with respect to the input digital data stream.

23. The device according to claim 22, including means for introducing idle data blocks into the output digital data stream when the output transmission rate of the corresponding output port is greater than the input transmission rate.

24. The device according to claim 22, wherein the delay means comprises a memory and N first-in first-out logical buffers established therein, each logical buffer being associated with a separate replicated digital data stream, wherein data blocks associated with each logical buffer are forwarded to the corresponding output port only when the logical buffer is full such that the relative delay encountered by the replicated cell stream corresponds to the length of the logical buffer.

25. The device according to claim 23, wherein the delay means comprises a memory and N first-in first-out logical buffers established therein, each logical buffer being associated with a separate replicated digital data stream, wherein data blocks associated with each logical buffer are forwarded to the corresponding output port only when the logical buffer is full such that the relative delay encountered by the replicated digital data stream corresponds to the length of the logical buffer.

26. The device according to claim 25, wherein the delay means for each replicated output digital data stream comprises the output transmission rate of the corresponding output port, whereby the relative delay encountered by the replicated digital data stream corresponds to the transmission rate of the corresponding output port.

27 The device according to claim 24, wherein logical buffers are established by copying each input data block into different physical buffers organized in the memory.

28. The device according to claim 26, wherein logical buffers are established by copying each input data block into different physical buffers organized in the memory.

29. The device according to claim 24, wherein logical buffers are established by copying each input data block into one physical buffer and maintaining a separate pointer to the physical buffer for each logical buffer.

30. The device according to claim 26, wherein logical buffers are established by copying each input data block into one physical buffer and maintaining a separate pointer to the physical buffer for each logical buffer.

31. The device according to claim 24, wherein the input and output digital data streams are ATM cell streams.

32. The device according to claim 26, wherein the input and output digital data streams are ATM cell streams.

33. A digital data stream replicating device, comprising:

an input port for receiving a continuous digital data stream at an input transmission rate;

a memory;

N output ports, each having an output transmission rate equal to the input transmission rate;

processing means, connected between the input port and the N output ports, for establishing N first-in first-out logical buffers and associating each data block of the input digital data stream with each one of the N logical buffers, each logical buffer being associated with only one of the output ports; and

scheduling means for forwarding data blocks associated with a given logical buffer through the corresponding output port when the given logical buffer is full.

34. The device according to claim 33, wherein the length of each logical buffer is selected to achieve a relative delay between the input digital data stream and the corresponding replicated digital data stream generated at the corresponding output port.

35. The device according to claim 34, wherein the logical buffers are established by copying each input data block into different physical buffers organized in the memory .

36. The device according to claim 34, wherein the logical buffers are established by copying each input cell into one physical buffer and maintaining a separate pointer to the physical buffer for each logical buffer.

37. The device according to claim 34, wherein the input and output digital data streams are ATM streams.

38. A digital data stream replicating device, comprising:

an input port for receiving a continuous digital data stream at an input transmission rate;

a memory;

N output ports, each having an output transmission rate at least equal to the input transmission rate;

processing means, connected between the input port and the N output ports, for establishing N first-in first-out logical buffers and associating each data block of the input digital data stream with each one of the N logical buffers, each logical buffer being associated with only one of the output ports; and

scheduling means for forwarding data blocks associated with a given logical buffer through the corresponding output port when the given logical buffer is full.

39. The device according to claim 38, including means for introducing empty data blocks into the output digital data stream when the output transmission rate of the corresponding output port is greater than the input transmission rate.

40. The device according to claim 39, wherein the length of each logical buffer and the output transmission rate of the corresponding output port are selected to achieve

a relative delay between the input digital data stream and the corresponding replicated digital data stream generated at the corresponding output port.

41. The device according to claim 39, wherein the logical buffers are established by copying each input data block into different physical buffers organized in the memory .

42. The device according to claim 39, wherein the logical buffers are established by copying each input cell into one physical buffer and maintaining a separate pointer to the physical buffer for each logical buffer.

43. The device according to claim 39, wherein the input and output digital data streams are ATM streams.

44. A performance testing device, comprising:

a traffic generator for generating a continuous digital data stream;

an input port for receiving the continuous digital data stream at an input transmission rate;

broadcast means for replicating the input digital data stream N times;

N output ports for transmitting each such replicated digital data stream through a separate output port at an output transmission rate at least equal to the input transmission rate; and

delay means for introducing a relative delay for each said output digital data stream with respect to the input digital data stream.

45. A performance testing device, comprising:

a traffic generator for generating a continuous digital data stream;

an input port for receiving the continuous digital data stream at an input transmission rate;

a memory;

N output ports, each having an output transmission rate at least equal to the input transmission rate;

processing means, connected between the input port and the N output ports, for establishing N first-in first-out logical buffers and associating each data block of the input digital data stream with each one of the N logical buffers, each logical buffer being associated with only one of the output ports; and

scheduling means for forwarding data blocks associated with a given logical buffer through the corresponding output port when the given logical buffer is full.

46. The device according to claim 45, including means for introducing idle data blocks into the output digital data stream when the output transmission rate of the corresponding output port is greater than the input transmission rate.

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